SECTION 2.0

Inboard Area Sites

Section 2.0 contains all of the information related to the Inboard Area sites. This section is organized as follows:

2.1: Site Background and Extent of Contamination provides background information and discusses the nature of contamination for each site located in the Inboard Area. It includes a brief summary of the historical investigations and describes, in general terms, the nature of contamination found at the Inboard Area sites. Background information on each Army BRAC site is provided, along with a discussion of additional Army BRAC environmental concerns and other environmental issues to be addressed by the HWRP.

2.2: Overview of Risk Assessment and Action Goals provides an overview of the risk assessment and the process used to establish action goals for Inboard Area sites. It presents details about the processes used to determine contaminants of concern (COCs) and to establish action goals.

2.3: Remedial Action Objectives (RAOs) describes the goals that proposed remedial actions are expected to accomplish, the development of RAOs, identifies RAOs for the Inboard Area sites, and presents how the different agencies (DTSC, RWQCB, and Army) identify and implement their respective laws and standards for selection of remedies.

2.4: Summary and Evaluation of Alternatives summarizes the evaluation and selection of remedial alternatives for each of the Inboard Area sites recommended for further action. These sites are divided into three groups: Army BRAC sites, other Army BRAC Environmental Considerations, and HWRP Issues. This section summarizes the process used to evaluate alternatives for each of these groups.

Information for the Coastal Salt Marsh Area sites is presented in Section 3.0.

SECTION 2.1

Site Background and Nature of Contamination

This section provides background information and discusses the nature of contamination for each site located in the Inboard Area. Section 2.1.1 provides a brief summary of the historical investigations and describes in general terms the nature of contamination found at the Inboard Area sites. Section 2.1.2 identifies the sites within the Inboard Area that are evaluated in this ROD/RAP. Section 2.1.3 provides background on each Army BRAC site and identifies the nature of contamination and chemicals of concern (COCs). Section 2.1.4 discusses additional Army BRAC environmental concerns. Section 2.1.5 covers other environmental issues to be addressed by the HWRP.

2.1.1 Historical Investigations and Nature of Contamination

Numerous activities were conducted in the Inboard Area sites between 1985 and 2002. These activities included remedial investigations, interim removal actions, and a human health and ecological risk assessment. The findings of these activities are found in the following primary documents; a complete listing of the Administrative Record documents can be found in Appendix A:

- *Remedial Design Investigation Final Data Report* (FW, 2000): Two phases of sampling were completed at the paved revetment areas. The first phase of the investigation was conducted in the general revetment area to address data gaps and design issues associated with Inboard Area-Wide distribution of pesticides, PAHs, and metals. Phase 2 of the investigation was conducted to address site-specific issues associated with paved revetments that were formerly characterized using composite samples or had data gaps.

- *Comprehensive Remedial Investigation* (IT, 1999a): Inboard Area sites were investigated during the RI, which reviewed and evaluated previous investigation data; compared the results to newly collected data; and collected and analyzed soil, sediment, and water samples to determine whether the sites were affected by past activities. During the RI, additional background data were collected for metals. These data were combined with background data collected in previous investigations and used to determine baseline (or background) concentrations for metals and polynuclear aromatic hydrocarbons in sediment and soil. The Comprehensive Remedial Investigation combines data from activities conducted between 1985 and 1997.

- *1999 Interim Removal Action Data Report* (IT, 1999c): Interim removal actions were conducted at the following Inboard Area sites in 1999: Former Sewage Treatment Plant, Building 35/39 Area, Building 41, Building 82/87/92/94 Area, PDD Spoils Pile B, C, E, H, I, J, and L, and Revetment 9. Soil was excavated and disposed of offsite, and samples were collected following the removal actions.

- *1998 Interim Removal Action Data Report* (IT, 1999c): Interim removal actions were conducted at the following Inboard Area sites in 1998: FSTP, Building 20, Building 35/39 Area, Building 41 Area, Building 82/87/92/94 Area, Building 86, PDD, PDD Spoils Piles

A through E and G through N, East Levee Generator/Pad, Revetment 10, and Revetment 18/Building 15 Area. Soil was excavated and disposed of offsite, and samples were collected following the removal actions.

The types of contaminants detected at various sites within the Inboard Area include:

- TPH-d, TPH-g, JP-4, or TPH-motor
- Metals
- Dioxins and furans
- VOCs
- SVOCs including PAHs
- PCB
- Pesticides/herbicides

During the Focused Feasibility Study (FFS), data were reviewed from groundwater wells located in the vicinity of the Inboard Area sites where potential scour within channels may occur during the development and maturation of the wetland. The review concluded that groundwater does not pose a threat to surface water or aquatic receptors. As discussed in Appendix B, 18 groundwater monitoring wells were sampled in 2001 and 2002 (USACE, 2002a and 2002b). The results of recent groundwater sampling verified that groundwater beneath the Main Airfield Parcel does not adversely affect saltwater aquatic life or human health from past Department of Defense (DoD) activities (USACE, 2002a and 2002b).

2.1.2 Sites Evaluated in This ROD/RAP

Inboard Area sites evaluated in this ROD/RAP are divided into three groups: Army BRAC sites, other Army BRAC Environmental Considerations, and HWRP Issues. The sites included in each group are listed below and are shown in Figure 2.1-1 (following the tables at the end of this text). The text provided below also indicates how sites within each of the three groups are evaluated in the ROD/RAP. Section 2.4 provides details on the alternatives that are evaluated in this ROD/RAP.

2.1.2.1 Army BRAC Sites

Inboard Area Army BRAC sites that are addressed in this ROD/RAP are listed in Table 1-1.

This ROD/RAP determines the need for remedial action and fully develops and evaluates alternatives for each Army BRAC site that requires remedial action. This ROD/RAP evaluates Alternative 1, No Further Action; Alternative 2, Excavation and Offsite Disposal; and Alternative 3, Manage In-Situ, with Monitoring and Maintenance for Army BRAC Sites. Alternative 4 was developed specifically for issues that will be addressed by the HWRP, and is not evaluated for the Army BRAC sites. The Army BRAC program will perform the environmental response actions for the Army BRAC sites that require remedial action.

2.1.2.2 Other Army BRAC Environmental Concerns

In addition to the Army BRAC sites identified above, three other environmental concerns are addressed in this ROD/RAP by the Army BRAC program. These issues include a group of four sites identified by the Archive Search Report, the GSA/BRAC soil stockpiles located on the runway, and radiological cylinders.

The Archive Search Report sites addressed in this ROD/RAP are listed below:

- Testing Range—ASR Site #4
- Alleged Hazardous, Toxic, and Radiological Waste (HTRW) Disposal Site—ASR Site #8
- Skeet Range—ASR Site #18
- Firing-In-Butt—ASR Site #19

Section 4.0 provides a schedule of activities that will be completed by the Army BRAC program to address the Archive Search Report sites. Because information and data available for these sites are still undergoing review, decisions regarding the need for remedial action and the evaluation of alternatives for these sites are not included in this ROD/RAP. However, the Army, DTSC, and the RWQCB have agreed to complete the study/investigation activities listed in Section 4.0 for the Archive Search Report sites in accordance with the schedule indicated. Should remedial action be required at the Archive Search Report sites, the action goals included in this ROD/RAP will apply.

The RWQCB will determine what additional actions (if any) may be required with respect to the GSA/BRAC stockpiled soil currently on the runway (see Section 2.1.5.1). The Army will be responsible for conducting any additional actions required by the RWQCB.

No environmental concerns were identified for the Radiological Cylinders (see Section 2.1.4.3). Therefore no remedial action is proposed for this issue.

2.1.2.3 Hamilton Wetland Restoration Project Issues

The Army Civil Works Program, through the HWRP, will take actions described in this ROD/RAP to address the potential risks posed by the following environmental issues:

- Inboard Area-Wide DDTs
- PAHs in soil adjacent to the runway
- Lead-based paint

For the Inboard Area-Wide DDTs and PAHs in soil adjacent to the runway, this ROD/RAP evaluates two alternatives: Alternative 1, the No Further Action alternative; and Alternative 4, Manage Onsite, with Monitoring and Maintenance for the Army Civil Works Program. Alternative 4 was specifically developed for issues that will be addressed by the Army Civil Works Program through the HWRP. Alternatives 2 and 3 were not considered because they apply only to sites being addressed by the Army BRAC program.

To address possible lead contamination from lead-based paint at current and previously demolished building locations, the ROD/RAP selects the following alternative. The HWRP will provide 3 feet of stable cover over the footprint of the building and to a distance of 6 feet beyond the building footprint. If 3 feet of cover cannot be achieved, the soil area at these current and previously demolished building locations, plus 6 feet beyond the building perimeter, will be scraped to a depth of 6 inches and managed elsewhere on site beneath 3 feet of stable cover. The building foundation and any concrete/asphalt/hard foundation surface adjacent to the building may remain. The age of historical and existing buildings is described in the Environmental Baseline Survey (EBS) (CH2M HILL, 2003). No other alternatives were considered or evaluated.

2.1.3 Background and Nature of Contamination—Army BRAC Sites

The following subsections describe each Army BRAC site located in the Inboard Area, summarize the types of contaminants (metals, pesticides, TPH, etc.) detected at each site, describe any interim removal action work performed, and identify the ROD/RAP COCs detected at the site. As presented in Section 2.2, remedial actions are evaluated in this ROD/RAP for detections of residual COCs that are found above action goals. Action goals and COCs are defined in Section 2.2. Specific information regarding sample locations and individual sample results is available in the primary reports cited for each Inboard Area site. The location of each site is shown on Figure 2.1-1.

2.1.3.1 Former Sewage Treatment Plant

The FSTP was constructed in 1941/1942 and was located at the eastern edge of the Inboard Area, close to Perimeter Road and the PDD, and immediately southwest of the pump station area. Prior to construction of the FSTP, sewage was discharged to the San Pablo Bay through a pipeline extended approximately 600 feet to the Bay near the southeast end of the runway. The FSTP consisted of several buildings, a digester, and four sludge drying beds. The beds were unlined and were contained within earthen berms. Sewage generated at HAAF was processed by treatment at the FSTP. Treated effluent water was discharged into San Pablo Bay via an outfall pipe. Beginning in 1986, sewage from the remaining operating areas of HAAF was directed to the Novato Sanitation District. This site was identified in the Archive Search Report as ASR Site #2.

The FSTP buildings were demolished and the sludge, berms, and bed dikes were removed and disposed of in an offsite landfill in 1987 (IT, 1999).

The RI presented information regarding the former sludge drying beds, digester, and the abandoned sanitary sewer lines. Metals, PCBs (Aroclor 1254), DDT, and DDE were detected in the soil boring samples collected from around the former sludge drying beds at depths ranging from 1 to 6.5 feet below ground surface (bgs). There was one detection of DDE at depth of 11.5 feet bgs. PAHs and unknown extractable hydrocarbons (UHE) were also detected at depths ranging from 3.5 to 4 feet bgs and 2 feet bgs, respectively in a pothole sample. UHE, PAHs, DDT, and DDE were also detected in two soil borings drilled to the south and west of the monitoring well (MW) TP-MW-101 (IT, 1999). TPH-g; UHE; benzene, toluene, ethylbenzene, and xylene (BTEX); VOCs; heptaclor; and 13 metals were detected in one groundwater sample collected from the former monitoring well (IT, 1999). Monitoring well TP-MW-101 was removed during the 1998 interim removal actions. In addition, five water samples were collected from inside sanitary sewer lines SS-1 through SS-6. Metals, VOCs, one pesticide, and TPH, including UHE (IT, 1999) were detected in the water samples. Coliform bacteria were also detected in the SS-1 water sample.

An interim removal action was conducted in 1998 at the former sludge drying beds at the FSTP. Following the 1998 interim removal actions, metals, pesticides, and TPH-d were detected in the confirmation soil samples at depths ranging from 2.5 feet to 7.5 feet (the 7.5 feet bgs samples were collected only in the southeastern corner of the excavation). After the 1998 interim removal action, a black sludge layer was identified in soil located on the eastern side of the area , and was excavated in 1999. After the 1998 interim removal action, a black sludge layer was identified in soil located on the eastern side of the area and was excavated in 1999. Following the 1999 interim removal actions, DDD, DDT, dieldrin, silver,

mercury, and TPH-d were detected in confirmation samples at depths ranging from 3 to 4 feet bgs. Only DDT was detected above action goals at depths ranging from 3 to 10.5 feet bgs.

The evaluation of COCs during the ROD/RAP process did not identify any COCs for the FSTP. However, risk management evaluations determined that remedial action should be conducted to address individual detections of DDTs. To address these individual detections, DDTs are listed in Table 2.1-1.

2.1.3.2 Building 20

Building 20, on the northern Perimeter Road, was used to produce electricity for runway lighting, radar, or other activities. One transformer pad is adjacent to the east wall, and one diesel UST was buried on the southwest side of the building. The transformers have been removed (IT, 1999).

During a 1996 UST/AST investigation conducted by IT, an area of stained soil with a heavy hydrocarbon odor was observed about 10 feet west of the building. The UST and 10 feet of associated piping were removed during the RI. The UST excavation was extended to a depth of 10 feet bgs and the vertical extent of contamination from UHE, unknown purgeable hydrocarbons (UHP), and lead was determined to extend to 5 feet bgs. Lead was also detected in shallow soil samples collected from the northern, southwestern, and southern sides of Building 20 and in a water sample collected from the excavation. PCBs were not detected in soil samples collected from around the transformer pad and UHE and UHP were detected in one soil sample collected from the stained soil area (IT, 1999).

An interim removal action was conducted in the area of the former UST in 1998, and confirmation samples were collected at depths ranging from 5 to 10 feet bgs. Metals were the only constituents detected in confirmation samples; however, they were not detected above action goals.

The FFS evaluations did not identify any COCs at this site that could potentially pose a risk to human health or the environment (see FFS Table 1-7) (USACE, 2001). The FFS determined that no remedial action was required at this site to protect human health or the environment. Therefore, the No Further Action alternative was selected and this site is not evaluated in further detail in the ROD/RAP.

2.1.3.3 Building 26

Building 26 is located along the northern Perimeter Road, approximately 500 feet southeast of Building 20. A transformer pad is located on the west side of the building; the transformers have been removed (IT, 1999). One diesel UST was formerly located on the south side of the transformer pad, and a former AST was located inside the building. The UST excavation was backfilled.

During the RI, UHE was detected above its action goal at a depth of 5 feet bgs in the pothole sample collected from the northeastern side of the former UST, but not at 10 feet bgs in this same sample location. UHE was also detected above its action goal to the west and south of the former UST and Building 26, at depths ranging from 5 to 5.5 feet bgs, but not at 10 feet bgs. The action goal for TPH diesel is also used as the action goal for UHE. The horizontal extent of soil affected by fuel was estimated using the results of "step-out" samples, which showed declining concentrations away from the former UST location.

Table 2.1-1 lists the COCs for Building 26. Concentrations of COCs detected at this site exceed action goals.

2.1.3.4 Building 35/39 Area

The Building 35/39 Area is located near the northeast corner of the Inboard Area. Both buildings contain high-capacity pumps for the removal of water from the Main Airfield Parcel. The water is discharged via outfall pipes into the ODD, as discussed in Section 3.1.3.5, located immediately outside the perimeter levee in the coastal salt marsh, which flows into San Pablo Bay (IT, 1999). Features in this area include Building 35, which contains a large pump, and the former AST 6. AST 6 was formerly located at the northeastern corner of Building 35. AST 5 was located southeast of Building 39. Three active transformers are located midway between the two buildings, and outfall pipes are located at each building to discharge water from the pumps through the levee into the ODD (IT, 1999).

RI activities were conducted to assess potential impacts from PCBs to the soil around the transformer pad. PCBs were not detected in the soil samples at the transformer pad, but metals were detected in a groundwater sample collected from monitoring well PS-MW-101 (located northeast of Building 35). In addition, results of previous investigations detailed in the RI indicated that the surface soil was contaminated from toluene and PAHs near the fill port of former AST 5 at Building 39 and lead, PAHs, and toluene were detected in surface soil samples collected beneath former AST 6.

Following the 1998 interim removals in the Building 35/39 Area, UHE and lead were detected at depths ranging from 2.5 to 5 feet bgs in soil confirmation samples southwest of Building 39. In addition, lead, TPH, DDTs, UHE, and PAHs were detected at depths ranging from 3 to 7.5 feet bgs in soil confirmation samples collected following the 1999 interim removal actions. DDTs were detected above both action goals established for DDTs (0.03 and 1 ppm) at a depth of 4.5 feet bgs adjacent to the outfall pipeline for Building 35.

Table 2.1-1 lists the COCs for the Building 35/39 Area. Concentrations of COCs detected at this site exceed action goals.

2.1.3.5 Building 41 Area

Building 41 was a pump station in the southern portion of the pump station area. Two 1,100-gallon diesel USTs formerly located on the northwestern side of Building 41 supplied fuel for the pumps at the building. Structures in and around Building 41 have been removed. Features at the site included four inoperable diesel-powered pumps inside Building 41 and two former ASTs east of Building 41. Former Building 40 and three former transformers (on a concrete pad) were located northeast of Building 40. One outfall pipe extended 80 feet southeast from Building 41, through the levee, to a discharge point in the ODD in the coastal salt marsh (CH2M HILL, 2001). Discharges from the pipeline are believed to contribute to contamination in the ODD, as discussed in Section 3.1.3.5.

During the RI, soil samples were collected at Building 41 to determine the extent of TPH contamination from the former USTs and contamination of PCBs of the soil at the transformer pad. One groundwater sample was also collected from groundwater monitoring well PSA-MW-3 (located southeast of Building 41).

UHE and lead were detected along the southwestern side of the USTs at a depth of 8 feet bgs (IT, 1999). Lead was the only analyte detected in a step-out pothole sample collected from an area located across the PDD; the sample was collected to determine the westward extent of fuel contamination. PCBs were not detected in the soil samples collected from the transformer pad. Metals and UHE were detected in the groundwater sample collected from monitoring well PSA-MW3. Before the RI, lead was detected in several soil samples located near the northern side of Building 41.

During the 1998 interim removal conducted in the Building 41 Area, UHE and lead were detected in the confirmation samples. UHE and PAHs were detected above guidance levels (established for the interim removal action) in a boring collected adjacent to the northern section of Building 41. During the 1999 interim removal at the UST, TPH-d was detected in confirmation samples, which were collected at depths ranging from 4 to 9.5 feet bgs. TPH-d was detected above its action goal.

In February 2002, during remediation activities at Building 41, contaminated soil was removed and disposed of offsite. The analytical results of the soil removal activities are provided in *Final Construction Report Building 41 Demolition and Soil Removal, Spoils Pile F Removal, and Revetments 6 and 7 Removal* (IT, 2003). After reviewing the analytical data from that event, it was agreed that some additional samples are needed to determine whether the actions are complete. As a result, for the purposes of this report, this site is being evaluated as though the actions have not yet taken place.

The COCs for Building 41 are listed in Table 2.1-1. Concentrations of COCs detected at this site exceed action goals.

2.1.3.6 Building 82/87/92/94 Area

Building 82

Building 82 is a single-story structure located south of former Building 86 and approximately 50 feet from Perimeter Road. Building 82 was built in the area of former Building 91; an air freight terminal. Building 82 was used, in turn, for flight operations (IT, 1999), aircraft rescue, and first aid (CH2M HILL, 2001). Currently, Building 82 is used by the Marin County Sheriff's Department for storage of training and safety equipment and by the Army for its HAAF BRAC office. A transformer previously was located on a concrete pad northeast of the building. Also, one propane tank is located on the northeastern corner of the building. RI activities were conducted at Building 82 to identify PCB contamination in soil at the former transformer pad. PCB (Aroclor-1260) was detected in all soil samples; the highest concentration was found on the southeast side of the transformer pad at a depth of 10 to 17 inches bgs. However, PCBs were not detected in the step-out samples. In addition, UHE was detected in two pothole samples. Step-out samples were collected at depths ranging from 2 to 10 feet bgs.

During the 1998 interim removal actions, soil was removed from the Building 82 transformer pad to a depth of 4 feet bgs. UHE, UHP, and PCB were detected above their guidance levels (established for the interim removal actions) in confirmation soil samples at depths ranging from 2.5 to 4.5 feet bgs. The Army conducted an additional removal action in 1999 to address contamination identified at the Building 82 transformer pad following 1998 interim removal actions. Total petroleum hydrocarbon extractable (TPH-e) was detected in a groundwater

sample collected from one of the pothole wells; the concentration of TPH-e was below established water screening levels (IT, 2000b). TPH-d and lead were detected below guidance levels.(established for the interim removal actions) in soil samples collected at depths ranging from 0.5 to 7 feet bgs. PCBs were not detected in soil samples collected from the 1999 excavation, and they were not detected in groundwater samples collected from the potholes.

The Army conducted an additional soil and groundwater investigation at Building 82 in September 2002 (Cerrudo Services, 2002). Soil and groundwater samples were collected inside and outside of Building 82 and were analyzed for TPH constituents and BTEX. No further action for groundwater is necessary at this site (see Appendix B).

Building 87

Building 87, located immediately south of the aircraft parking lot, was used to store products (5 gallons or less) such as paint, oil and grease, antifreeze, and solvents. Numerous 55-gallon drums of solvent and cleaning compounds were stored on horizontal dispensing racks in the area around Building 87. One metal CONEX container, located northwest of Building 87, contained unleaded gasoline in 5-gallon containers. The racks and drums were occasionally moved to various locations surrounding the building (IT, 1999).

During an investigation conducted by the Army in 1993, metals were detected above their background concentrations in the soil samples collected from around Building 87. Metals were also detected in groundwater samples collected from monitoring well AM-MW-104. PAHs, metals, TPH, and VOCs were detected in sediments collected from several catch basins in the storm drain system (ESI, 1993).

Building 92/94 Area

Buildings 92 and 94 are single-story structures located north of Building 82 and to the west of former Building 86. The buildings were used for aircraft maintenance and storage (IT, 1999) and to store supplies for aircraft rescue and offices (CH2M HILL, 2001). They are currently used to store records and sampling equipment. Three transformers were located on a concrete pad between Buildings 92 and 94. The asphalt is deteriorated on the southern, western, and eastern sides of the pad. Storage Area 3 was located on the eastern side of Building 94. The storage area contained five metal containers used to store maintenance related fluids such as fuel, paint, and solvents. Curbing or other surface containment did not surround the area.

In 1993, sampling activities were conducted at locations east of Building 94 (ESI, 1993). Soil samples were collected from two test pits and two soil borings. Metals were detected in the samples.

RI activities were conducted at the Building 92/94 Area to address the potential impacts on soil from PCBs. Aroclor-1260 was detected in soil samples collected from 0 to 2.5 feet bgs; however, it was not detected in the step-out samples. Lead was detected below its background concentration in a green-stained rocky fill that was observed during the step-out sampling; fuel hydrocarbons were not detected in the samples of stained fill (IT, 1999).

During the 1998 interim removal actions conducted at the Building 92/94 Area, PCBs were detected below the guidance level (established for the interim removal action) at a depth of 4.5 feet bgs in one confirmation sample. The sample was located along the southeast corner of the transformer pad.

The COCs for the Building 82/87/92/94 Area are listed in Table 2.1-1. Concentrations of COCs detected at this site exceed action goals.

2.1.3.7 Building 84/90 Area

The Building 84/90 Area is at the southeastern end of the former AMSF area, northwest of Perimeter Road and south of the taxiways. Building 84 was used for repair of aircraft electronics equipment (IT, 1999). A fenced enclosure just northeast of Building 84 formerly contained a concrete slab and three transformers. The transformers were removed in 1995 (IT, 1999). Three electrical units of unknown use are located on the northern exterior wall beneath an awning. There were no documented releases of hazardous materials at this site. This site was identified in the Archive Search Report as ASR Site #7.

Building 90 was an aircraft avionics shop (USACE, 2003). Based on the recent historic research conducted by the Army, the area was used for aircraft avionics maintenance activities, including radar systems testing and calibration (USACE, 2003). The southern end of the building is a small utility/electrical room, and two wash racks adjoin the west side of the building. A small sump is on the southern side of the building. This sump was used as a receiving structure for a floor drain inside the southern shed of Building 90. A fence-enclosed transformer pad adjoined the southern side of the building. The transformers were removed in 1991 (IT, 1999).

RI activities were conducted at Buildings 84 and 90 to assess potential impacts to the site from operations and potential PCB contamination from the transformers (IT, 1999). Metals and PAHs were detected in a surface soil sample collected from surface to 0.5 foot bgs near the awning on the north side of Building 84. PCB was not detected at the former transformer pad at Building 84 in surface samples (0 to 0.5 foot bgs). Metals, PAHs, and UHE were detected in soil near Building 90. The depth of the soil samples ranged from surface to 12 feet bgs. A groundwater sample was also collected from one soil boring drilled west of Building 90, adjacent to the edge of the wash racks. Lead was detected in the groundwater sample. No PCB was detected at the former transformer pad at Building 90.

The FFS evaluations did not identify any COCs at this site that could potentially pose a risk to human health or the environment (see FFS Table 1-7) (USACE, 2001). The FFS determined that no remedial action was required at this site to protect human health or the environment. Therefore, the No Further Action alternative was selected and this site is not evaluated in further detail in the ROD/RAP.

2.1.3.8 Building 86

Building 86 was an aircraft maintenance hangar located about 50 feet southeast of the New Hamilton Partners (NHP) levee. A flammable materials locker and at least one recirculating solvent parts cleaner were located in Building 86. Substances used and waste generated at the hangar included stripping and degreasing solvents, oils, and paints. Storage Area 1, near the northeastern corner of Building 86, was used for drum storage. Drums were placed horizontally on metal storage and dispensing racks. Waste material from activities at Building 86 were taken by U.S. Army personnel to a storage area located in the southwestern corner of the building (Storage Area 2). Storage Area 2 consisted of 55-gallon drums and smaller containers, which stored waste oils, waste fuel, and other maintenance-related fluids. The materials were stored within a metal container that rested on a gravel surface.

Building 86 was removed in 1998 (IT, 1999). The remaining building pad is adjoined by concrete aircraft aprons on the north, east, and south, and by a concrete slab on the west.

Before the RI, metal and PAH contaminants were detected in sediment samples collected from five storm drains located east and northeast of Building 86 (IT, 1999). The Army also removed soil affected by TPH from a small area located within 30 feet of Building 86 in 1995 (IT, 1996b).

RI activities were conducted at Building 86 to address the contamination of TPH and other chemicals to the soil, PCB contamination at the transformer pad, and the potential to contaminate groundwater at monitoring well AM-MW-101 (IT, 1999). UHE, UHP, lead, and one PAH were detected in samples along the interior and exterior drains at Building 86. UHE, UHP, and lead were also detected in soil samples collected from the western corner of Building 86. PCBs were not detected at the transformer pad. Metals and UHE were detected in a groundwater sample collected from monitoring well AM-MW-101.

During the 1998 interim removal, a storm drain investigation was conducted at Building 86 (IT, 2000a). Metals were detected in the soil along the portion of SD-1 located southeast of Building 86 at depths ranging from 5.5 to 11.5 feet bgs. Several PAHs were also detected above their guidance levels (established for the interim removal action) at a depth of 10 feet bgs in the soil sample collected along the portion of SD-1 north of Building 87.

The COCs for Building 86 are listed in Table 2.1-1. Concentrations of COCs detected at this site exceed action goals.

2.1.3.9 Perimeter Drainage Ditch

The PDD is a drainage channel constructed to convey surface water runoff to pump stations for lifting and discharge into the ODD and San Pablo Bay. The PDD also conveys water from portions of the GSA properties, from privately owned agricultural lands adjoining the airfield, and overflow from Ignacio Reservoir. Additionally, there is an open drainage ditch at the base of Reservoir Hill in the GSA Phase I Sale Area that connects to the north end of the PDD by an underground storm-drain pipe (IT, 1999). Historically, drainage from the adjacent Hamilton North Antenna Field also entered the PDD. Rainfall in the North Antenna Field currently ponds onsite, and no longer drains to the PDD. The PDD encompasses all of the Main Airfield Parcel, except for the western margin. For the purposes of this ROD/RAP, the PDD is divided into three sections: (1) the unlined PDD, (2) the lined PDD outside of the proposed HWRP channel cut, and (3) the lined PDD within the proposed HWRP channel cut. These areas are described below and are shown on Figure 2.1-1.

When HAAF was constructed in 1932, the PDD began at what is currently the discharge point of the 54-inch-diameter storm drain and ran around the perimeter of the Main Airfield Parcel, exiting the Main Airfield Parcel near the southwestern boundary. The Army lined this portion of the PDD with concrete in 1940 to expedite runoff and reduce maintenance costs associated with removing vegetation that impeded flow in the ditch (US Army, 1940). The concrete lining extends approximately 5 feet up the side of the ditch, with 3 to 4 feet of bare soil from the top of the liner to the top of the ditch. The concrete lining is cracked, and pieces of the concrete liner have broken away over the years. However, a vast majority of the lining is still intact. A portion of the lined PDD is located in the proposed HWRP channel cut (see Figure 2.1-1).

During the remedial design investigation, two surface soil samples were collected from partings or cracks located in the lined PDD. One of these locations was within the proposed HWRP channel cut area. Pesticides, herbicides, metals, and PAHs were detected in the samples (FW, 2000). The banks of the PDD above the concrete lining within the proposed HWRP channel cut were excavated in December 2001/January 2002, during the Building 41 demolition and soil-removal activities (IT, 2003).

In the 1950s, the drainage ditch was realigned to accommodate the extension of the runway. The new ditch began at the base of POL Hill, flowed north to a subsurface storm drain at the north end of the runway, and turned south to meet up with the original lined PDD, as shown on Figure 2.1-1. This portion of the PDD is not lined. The RI investigated the unlined portion of the PDD for PCBs, metals, PAHs, and pesticides. Metals, PAHs, and pesticides were detected in the unlined PDD sediments.

The unlined PDD was dewatered and sediment was removed during the 1998 interim removal actions. Following removal actions, the highest level of residual contamination in the unlined portion of the PDD was located in the northernmost section. UHE, metals, and pesticides were detected in the confirmation samples in the northern section of the unlined PDD. Dioxins, furans, DDTs, nickel, UHE, and benzo(b)fluoranthene were detected in the southern section of the unlined PDD. DDTs were detected above both action goals established for DDTs (0.03 and 1 ppm) within portions of the unlined PDD.

The COCs for the unlined PDD, lined PDD outside the proposed HWRP channel cut, and the lined PDD within the proposed HWRP channel cut are listed in Table 2.1-1. Concentrations of COCs detected at these sites exceed action goals.

2.1.3.10 PDD Spoils Piles

Since the 1930s, the PDD was periodically dredged to remove vegetative matter and sediment. During the 1990s, dredged material was placed in 14 separate locations, later designated Spoils Piles A through N. The spoils piles were identified based on review of aerial photographs and field reconnaissance (ETC, 1994).

Sampling activities were conducted at the PDD spoils piles in 1995 (WC, 1996). Metals, PAHs, oil and grease, chlordane, pesticides, methylene chloride, and SVOCs were detected in the spoils piles. Removal actions were conducted in 1998 at Spoils Piles A through E and G through N. Removal actions were conducted in 1999 at Spoils Piles B, C, E, H, I, J, and L. Following the 1998 and 1999 removal actions, the following residual contaminants were present at the former spoils piles locations:

- Spoils Pile A—Metals, UHE, and DDTs were detected in the confirmation sample at a depth of 1 foot bgs.
- Spoils Pile B—Metals, DDTs, endrin aldehyde, and endrin ketone were detected in confirmation samples at a depth of 0.5 foot bgs.
- Spoils Pile C—DDTs were detected in the confirmation sample, at a depth of 0.5 foot bgs.
- Spoils Pile D—Metals and DDTs were detected in the confirmation sample at a depth of 1 foot bgs.

- Spoils Pile E—DDTs were detected in confirmation samples collected from excavations at a depth of 0.5 foot bgs.
- Spoils Pile G—Metals and DDTs were detected in the confirmation sample at a depth of 0.5 foot bgs.
- Spoils Pile H—TPH-d and DDTs were detected in confirmation samples at a depth of 0.5 foot bgs.
- Spoils Pile I—During the 1999 removal action, no chemicals were detected in the confirmation sample collected at a depth of 0.5 foot bgs, which was analyzed for pesticides and TPH-e. Sample SS-PDSP-I01 (collected in 1998) was not removed during the 1999 removal action; beryllium and DDTs were detected in this sample at a depth of 1 foot bgs.
- Spoils Pile J—DDTs, benzo(a)pyrene, benzo(g,h,I)pyrene, indeno(1,2,3-cd)pyrene, and pyrene were detected in confirmation samples at a depth of 0.5 foot bgs.
- Spoils Pile K—Metals and DDTs were detected in a confirmation sample at a depth of 1 foot bgs.
- Spoils Pile L—Metals and DDT were detected in the 1998 interim removal action sample; these results were used in the risk assessment. However, the 1999 removal action removed the 1998 sample point, and nickel was the only contaminant detected in the confirmation sample at a depth of 0.5 foot bgs.
- Spoils Pile M—Metals and DDTs were detected in confirmation samples at a depth of 1 foot bgs.
- Spoils Pile N—Metals, UHE, benzo(a)pyrene, and DDTs were detected in confirmation samples at a depth of 1 foot bgs.

Interim removal actions were conducted for Spoils Pile F in 2002. Samples collected at Spoils Pile F in 1995 indicated metals, PAH, and DDT contamination. In February 2002, during remediation activities at Spoils Pile F, contaminated soil was removed and disposed of offsite. The analytical results of the soil removal activities are provided in *Final Construction Report Building 41 Demolition and Soil Removal, Spoils Pile F Removal, and Revetments 6 and 7 Removal* (IT, 2003). After reviewing the analytical data from that event, it was agreed that some additional samples are needed to determine whether the actions are complete. As a result, for the purposes of this report, this site is being evaluated as though the actions have not yet taken place.

The COCs for PDD Spoils Piles (except Spoils Piles E and H) are listed in Table 2.1-1. Concentrations of COCs detected at the Spoils Piles (except Spoils Piles E and H) exceed action goals.

The FFS evaluations did not identify residual COCs at Spoils Piles E or H that could potentially pose a risk to human health or the environment. The FFS determined that no remedial action was required at Spoils Piles E or H to protect human health or the environment. Therefore, the No Further Action alternative was selected and Spoils Piles E and H are not evaluated in further detail in the ROD/RAP.

2.1.3.11 East Levee Generator Pad

The East Levee Generator Pad is located midway between the FSTP and the southern end of the runway. One transformer pad and one generator pad were formerly adjacent to each other at a former AST site.

RI activities were conducted at this site to investigate contamination from PCBs at the former transformer location and contamination from fuel constituents at the former generator and AST locations (IT, 1999). Pesticides and metals were also investigated in the general vicinity of the site. PCBs were not detected in surface soil samples collected at the generator pad. However, lead, seven PAHs, and UHE were detected in the northern sample and lead and UHE were also detected in the southern sample.

Excavation activities were conducted beneath the generator pad during the 1998 interim removal actions (IT, 2000a). Although metals were detected in confirmation samples, no metals were detected above action goals.

The FFS evaluations did not identify any COCs at this site that could potentially pose a risk to human health or the environment (see FFS Table 1-7) (USACE, 2001). The FFS determined that no remedial action was required at this site to protect human health or the environment. Therefore, the No Further Action alternative was selected and this site is not evaluated in further detail in the ROD/RAP.

2.1.3.12 Onshore Fuel Line Sites

From circa 1945 until 1975, the onshore fuel line (ONSFL) was used to transport aviation gasoline and, later, JP-4 liquid fuels from the Offshore Fuel System to several locations around the airfield. Before the installation of the fuel line, fuel was delivered by rail or tanker truck.

The fuel line included an offshore portion, between the unloading terminal in the Bay and the booster pump station just inside the east levee, and an onshore portion, which extended from the booster pump station to the airfield hangars. This offshore portion was previously closed, as documented in letters from RWQCB and DTSC, dated July 30, 1999, and September 9, 1999 (RWQCB, 1999 and DTSC, 1999). For the purposes of evaluation during the RI and risk assessment, the ONSFL was divided into three sections:

- 54-inch Drain Line Segment (former 6-inch-diameter fuel pipeline that ran under the northwestern end of the runway via a 54-inch-diameter storm drainage culvert)
- Hangar Segment (southeast trending parallel fuel pipelines formerly located in the grassy area between the runway and the hangars)
- Northern Segment (former 6-inch-diameter fuel line along the northern perimeter of the Inboard Sites parcel)

The fuel lines were removed in 1995 except for the portion from the PDD to the levee, which was removed in 1998. Total purgeable petroleum hydrocarbon (TPH-p), ethylbenzene, xylenes, PAHs, and lead were detected in the soil samples collected after removal of the fuel lines. The soil located along the hangar fuel lines has been contaminated by petroleum hydrocarbons, PAHs, VOCs, and lead. Most of the contamination was located at depths ranging from 5 to 10 feet bgs (IT, 1999). However, during actions to remove the pipelines,

contaminated soils were returned to the excavation. Therefore, there may be contamination at or near the surface. The soil beneath the board-mounted transformer, located at the booster pump station in the northeastern corner of the Main Airfield Parcel, was investigated for PCBs during the RI. PCBs were not detected. Additional sampling also was conducted along previous sample areas of the fuel line to determine the extent of fuel contamination for locations with high concentrations of fuel contamination. Results of the soil sampling indicated that most of the contamination is within 20 feet of the trench; however, one location required step-outs to 50 feet beyond the trench.

The COCs for the ONSFL are listed in Table 2.1-1. Concentrations of COCs detected at this site exceed action goals.

2.1.3.13 Northwest Runway Area

The Northwest Runway Area was investigated initially as part of the GSA Phase II Sale Area (IT, 1998). The site is located at the extreme northern end of the Main Airfield Parcel, along the southeastern slope of the northern perimeter levee, between Ignacio Reservoir Marsh and an alkali marsh. This site was originally identified as an area of potential concern through an aerial photograph review, which showed possible surface disturbances. A geophysical survey conducted in this area identified anomalies that suggested that buried objects might be present at suspected Landfill 23 located primarily in the GSA Phase II Sale Area (IT, 1998). Soil and groundwater investigations did not encounter debris that was indicative of landfill activity. This site is also known as ASR Site #17.

Investigations of soil and groundwater began at this site in 1985. Metals, DDD, TPH, and bis(2-ethylhexyl)phthalate (a common laboratory contaminant) were detected in the soil samples collected along the northwestern runway area. No evidence of landfill activity was identified. Four groundwater monitoring wells (MW-PVC-1, -2, -3, and -4) were installed in August 1985, and were sampled between October 1985 and September 1986. Groundwater results are discussed in Appendix B.

In 1997, four direct-push soil samples were collected and temporary monitoring wells (TW-001 through -004) were installed in the boreholes (IT, 1998). The soil samples were collected at depths of 5, 10, and 15 feet bgs. Metals were detected in the soil; their concentrations were within the range of background concentrations (IT, 1998). Groundwater results are discussed in Appendix B.

This ROD/RAP did not identify any COCs at this site, so it was determined that no remedial action is required to protect human health and the environment. As a result, the No Further Action alternative has been selected and this site is not evaluated in further detail in this ROD/RAP.

2.1.3.14 Tarmac East of Outparcel A-5

The tarmac east of Outparcel A-5 is a taxiway connecting the former AMSF with the northwestern portion of the runway. The tarmac is located northwest of former Building 86 and adjoins and includes a portion of the NHP levee constructed at the boundary between the GSA and BRAC properties.

The tarmac was identified for further investigation when a petroleum hydrocarbon and PAH plume located at Outparcel A-5 was found to extend northeast onto the Main Airfield

Parcel. During the RI, PAH, lead, and UHP were detected in pothole samples collected at the tarmac east of Outparcel A-5. The maximum horizontal extent of the plume from Outparcel A-5 is approximately 20 feet east of the levee beneath the tarmac and within the levee easement (IT, 1999). The majority of the TPH-contaminated soil is beneath the concrete at about 3 feet bgs; however, contaminated soil may extend to 10 feet bgs (IT, 1999).

The FFS evaluations did not identify any COCs at this site that could potentially pose a risk to human health or the environment (see FFS Table 1-7) (USACE, 2001). The FFS determined that no remedial action was required at this site to protect human health and the environment. Therefore, the No Further Action alternative was selected, and this site is not evaluated in further detail in the ROD/RAP.

2.1.3.15 Revetment Area

The revetment area, located east of the runway, is transected by asphalt-paved taxiways that connect 28 circular-shaped parking areas (revetment turnouts) and extensive undeveloped areas. The revetments were used for aircraft staging and refueling before 1974, except for Revetments 6 and 10, which were used as an engine test pad and firefighter training area, respectively (IT, 1999). Fuels, solvents, and vehicles were periodically ignited and doused at Revetment 10 from 1975 to 1987. Aircraft fueling via fuel trucks was also reported to have occurred in the revetment area. Revetments 6 and 10 were also identified in the Archive Search Report; they were referred to as the Engine Test Area and the Burn Pit, respectively.

In addition to the 28 revetments discussed above, the Archive Search Report identified 8 historic revetments in the Main Airfield Parcel. Two of these were paved over during the construction of the aircraft maintenance area, two became dirt roads, and one has been revegetated by the surrounding grass. These 8 historic revetments have not been investigated.

Of the 28 revetment turnouts, 24 are paved with concrete, and 4 are unpaved (9, 11, 12, and 23). Each turnout is nearly encircled by an earthen berm approximately 1 foot high. A thin layer of sediment, grass, and weeds is now present at many of the turnouts. Revetment 18 includes the Building 15 Area because they are geographically close.

A series of storm drains and drop inlets were located throughout the revetment area (see Figure 2.1-1).

The revetments are grouped in this ROD/RAP to provide a clearer summary of the investigations conducted at each revetment and the results of these investigations. The following is the breakout of these groups:

- Revetments 1 through 4, 7, 8, 13 through 17, 19 through 22, and 24 through 28
- Revetment 5
- Revetment 6
- Revetments 9, 11, 12, and 23
- Revetment 10
- Revetment 18/Building 15

The following subsections discuss each group of revetments and their respective investigations.

Revetments 1 through 4, 7, 8, 13 through 17, 19 through 22, and 24 through 28

During the 1993 Army investigation, soil samples were collected from beneath the revetment pads (ESI, 1993). TPH and lead were detected at Revetments 1, 2, 3, 4, 7, 8, 13 through 17, 19, 20, 21, 22, 24, and 28. Bis(2-ethylhexyl)phthalate (a common laboratory contaminant) was detected at Revetments 3 and 8. SVOCs were detected in the composite soil samples at Revetments 7, 15, 19 (only in the duplicate sample), 20, and 27. Additional samples were collected from around the pads located at Revetments 17, 20, 26, and 27 (ESI, 1993). Four soil borings were drilled around each pad and soil samples were collected at 4 to 5 feet bgs. The soil samples were analyzed for TPH, BTEX, and lead. TPH was detected at Revetments 17, 26, and 27. Lead and one PAH were detected above baseline concentrations; however, BTEX was not detected.

In 1993, the Army installed two additional wells, RV-MW-103 at Revetment 20 and RV-MW-102 at Revetment 26 (ESI, 1993). No constituents were detected in groundwater samples collected from monitoring well RV-MW-103. Groundwater was not sampled at RV-MW-102 because recharge was insufficient (ESI, 1993).

RI activities were conducted at Revetments 17 and 27. Soil samples were collected from the revetment to obtain more accurate TPH results than previously reported. Lead was detected below its background concentration at Revetments 17 and 27.

In 1999, UHE and UHP were detected in the surface soil samples collected from Revetments 1, 7, 13, 19, 21, 22, and 26 (FW, 2000). UHE also was detected in the surface soil samples at Revetments 2, 14, 24, 25, and 28 and UHP was detected at Revetments 3 and 4. TPH-D also was detected at Revetment 19. Metals were detected in the surface soil samples collected from all of the revetments. PAHs were detected in the surface soil samples collected from Revetments 1, 2, 4, 7, 13, 19, 21, 22, 24, and 25. Analyses of Revetments 15 and 19 resulted in estimated detections of VOCs in surface soil samples and analyses at Revetment 27 resulted in confirmed detections of VOCs in surface samples (FW, 2000).

In February 2002, during remediation activities at Revetments 6 and 7, contaminated soil was removed and disposed of offsite. The analytical results of the soil removal activities are provided in *Final Construction Report Building 41 Demolition and Soil Removal, Spoils Pile F Removal, and Revetments 6 and 7 Removal* (IT, 2003). After reviewing the analytical data from that event, it was agreed that some additional samples are needed to determine whether the actions are complete. As a result, for the purposes of this report, this site is being evaluated as though the actions have not yet taken place.

Table 2.1-1 lists the COCs for Revetment 7. Concentrations of COCs detected at Revetment 7 exceed action goals.

The FFS evaluations did not identify any COCs at Revetments 8, 17, 24, or 27 that could potentially pose a risk to human health or the environment (see FFS Table 1-7) (USACE, 2001). The FFS determined that no remedial action was required at these sites. The evaluation of COCs during the ROD/RAP process identified cadmium and lead as COCs at Revetment 15 and cadmium as a COC at Revetment 20. However, for each revetment, the COCs were detected in only one sample and the concentrations detected were only slightly above the action goal. Risk management evaluations during the FFS determined that no

remedial action was necessary at Revetments 15 and 20. Therefore, Revetments 15 and 20 are not evaluated in further detail in this ROD/RAP.

The baseline risk assessment and FFS evaluations did not identify any contaminants at Revetment 28 that could potentially pose a risk to human health or the environment (see FFS Table 1-1) (USACE, 2001). The FFS determined that no remedial action was required at this site. Therefore, the No Further Action alternative was selected and this site is not evaluated in further detail in the ROD/RAP. COCs were identified at the remaining revetments covered in this subsection.

Revetment 5

In 1993, TPH and lead were detected in samples collected from Revetment 5 (ESI, 1993).

In 1996, monitoring wells RVT-MW-1 through RVT-MW-3 were installed around a catch basin located next to Revetment 5 (IT, 1999). There were 10 metals detected in the groundwater samples collected from these wells, but organics were not detected (IT, 1999).

In 1999, analyses of Revetment 5 resulted in estimated detections of VOCs in a surface soil sample collected beneath the pavement (FW, 2000). UHP was also detected in the surface soil sample.

The baseline risk assessment and FFS evaluations did not identify any contaminants at Revetment 5 that could potentially pose a risk to human health or the environment (see FFS Table 1-1) (USACE, 2001). The FFS determined that no remedial action was required at this site. Therefore, the No Further Action alternative was selected and this site is not evaluated in further detail in the ROD/RAP.

Revetment 6

In 1990, one monitoring well (RV-MW-101) was installed adjacent to Revetment 6 (IT, 1999). Groundwater results are discussed in Appendix B.

Also, in 1990, surface and subsurface soil samples were collected from the edge of Revetment 6. Lead, toluene, and bis(2-ethylhexyl)phthalate (a common laboratory contaminant) were detected in the soil. Lead was detected below its background concentration (IT, 1999). In addition, in 1995, Woodward-Clyde (WC) also collected two soil samples at depths ranging from 2.5 to 3 feet bgs. No analytes were detected in the soil samples (IT, 1999).

One soil sample was collected from Revetment 6 in 1998, during the RI, and was analyzed for TPH. Toluene and lead were detected in the soil sample.

In 1999, dioxins were detected in three surface soil samples collected from the revetment (FW, 2000). Metals, PAHs, UHE, and UHP also were detected in the surface soil samples.

In February 2002, during remediation activities at Revetment 6, contaminated soil was removed and disposed of offsite. The analytical results of the soil removal activities are provided in *Final Construction Report Building 41 Demolition and Soil Removal, Spoils Pile F Removal, and Revetments 6 and 7 Removal* (IT, 2003). After reviewing the analytical data from that event, it was agreed that some additional samples are needed to determine whether the

actions are complete. As a result, for the purposes of this report, this site is being evaluated as though the actions have not yet taken place.

Table 2.1-1 lists the COCs for Revetment 6. Concentrations of COCs detected at this site exceed action goals.

Revetments 9, 11, 12, and 23 (unpaved revetments)

In 1996, WC investigated Revetments 9, 11, 12, and 23. Soil samples were collected from depths ranging from surface to 6 inches bgs and 1 to 1.5 feet bgs; soil borings were also installed at two additional locations (IT, 1999). The soil samples were analyzed for TPH-d, TPH-g, TPH-JP-4, TPH-motor oil, BTEX, PAHs, VOCs, metals, and oil and grease. Ten metals were detected above baseline concentrations and TPH, BTEX, and VOCs were not detected. Acenaphthene was detected above its baseline concentration at Revetment 9 at a depth of 6 inches bgs; it was not detected at 1.5 feet bgs. In addition, eight temporary monitoring wells, RVT-TW1 through RVT-TW8, were installed in soil borings at these unpaved revetments. Groundwater samples were collected and analyzed for TPH-d, TPH-g, TPH-JP-4, BTEX, and PAHs. Xylene was detected in the groundwater at Revetment 9 and ethylbenzene was detected in the groundwater at Revetment 12.

Before the RI, 10 metals were detected in the soil samples collected from the unpaved revetments at depths ranging from surface to 1.5 feet bgs. Xylene was detected in groundwater samples collected from temporary monitoring wells at Revetment 9, and ethylbenzene was detected at Revetment 12. RI activities were conducted at Revetments 11 and 23. During the RI, gasoline and UHE were detected in the soil at Revetment 11 and five metals were detected at Revetment 23.

Following the 1999 interim removal actions at Revetment 9, lead was detected in confirmation samples at levels below action goals.

The FFS evaluations did not identify any COCs at Revetment 9 that could potentially pose a risk to human health or the environment (see Table FFS 1-1) (USACE, 2001). The FFS determined that no remedial action was required at Revetment 9. Therefore, the No Further Action alternative was selected and this site is not evaluated in further detail in the ROD/RAP. Table 2.1-1 lists the COCs for Revetments 11, 12, and 23. Concentrations of COCs are detected above action goals at Revetments 11, 12, and 23.

Revetment 10

In 1987, soil samples were collected from three soil borings at Revetment 10 (the firefighter training area) at depths ranging from 1 to 9 feet bgs. The concentrations of seven metals were detected above their background concentrations. The highest detection of TPH was detected at a depth of 1 foot bgs (IT, 1999). PAHs were not detected.

In 1993, surface and subsurface soil samples and groundwater samples were collected at the Revetment (ESI, 1993). Toluene, anthracene, chrysene, bis(2-ethylhexyl)phthalate (a common laboratory contaminant), and lead were detected in the soil samples. Lead and four PAHs were detected above their background concentrations. Ethylbenzene, toluene, xylene, and 1,3-dimethylbenzene were detected in subsurface soil samples. Methyl ethyl ketone (MEK) and TPH were detected in the groundwater samples.

During the RI, a PCB investigation was conducted at Revetment 10. PCBs were not detected in the soil samples collected from the area.

During the 1998 interim removal, three dioxins and one furan were detected in soil samples at a depth of 1 foot bgs on the eastern side of the excavation; however, the detected concentrations were below action goals.

The FFS evaluations did not identify any COCs at Revetment 10 that could potentially pose a risk to human health or the environment (see FFS Table 1-7) (USACE, 2001). The FFS determined that no remedial action was required at this site. Therefore, the No Further Action alternative was selected and this site is not evaluated in further detail in the ROD/RAP.

Revetment 18/Building 15 Area

Building 15 is south of Revetment 18, along the northern perimeter of the Main Airfield Parcel. Building 15 formerly contained a generator that provided electrical power for airfield activities, such as runway lighting (IT, 1999). One concrete transformer pad is adjacent to the western side of the building. One former 120-gallon AST was located northwest of Building 15. The AST stored diesel fuel for the generator inside the building. Three transformers were also formerly located on soil adjacent to the concrete pad located west of Building 15; they were removed in 1995 (IT, 1999).

Building 15 was investigated to determine environmental impacts from fuel storage and PCB contamination at the transformer location during the RI (IT, 1999). The AST and associated piping were removed. UHE and lead were detected in soil samples collected southeast of the former AST at a depth of 1.5 feet bgs. The excavation was extended to 10 feet bgs and additional samples were collected. UHE was detected above step-out criteria at 7 feet bgs, but TPH was not detected at 8.5 feet bgs. Step-out potholes were also excavated to a depth of 10 feet bgs, about 20 feet from each side of the excavation, and one groundwater sample was collected from the step-out pothole east of the concrete pad. UHE was not detected in the step-out pothole soil samples; however, it was detected in the groundwater sample. PCBs were not detected in the surface soil samples collected from around the concrete transformer pad northwest of Building 15.

During the 1998 interim removal, lead and UHE were detected in confirmation samples collected from the AST and transformer area at Building 15. The constituents were detected at depths ranging from 5.5 to 9.5 feet bgs, but were below action goals.

During the remedial design investigation, pesticides, UHP, and PAHs were detected in the surface soil sample collected in the Revetment 18 area, and VOCs were detected in the surface soil sample collected beneath the pavement at the revetment (FW, 2000).

The baseline risk assessment and FFS evaluations did not identify any contaminants at Revetment 18/Building 15 that could potentially pose a risk to human health or the environment (see FFS Table 1-1) (USACE, 2001). The FFS determined that no remedial action was required at this site. Therefore, the No Further Action alternative was selected and this site is not evaluated in further detail in the ROD/RAP.

2.1.4 Background and Nature of Contamination—Other Army BRAC Environmental Concerns

This section provides background information on other Army BRAC environmental concerns that are addressed in this ROD/RAP. Where information on the nature of contamination is available it is provided. COCs have not been identified for these areas of environmental concern.

2.1.4.1 Archive Search Report Sites

The St. Louis District of the U.S. Army Corps of Engineers was contracted by U.S. Army Forces Command in 2000 to conduct an archival search on behalf of the Army BRAC office at HAAF. The purpose was to identify locations where contamination from base operations may have occurred. The results of their investigation were published in the Archive Search Report (USACE, 2001). The Archive Search Report includes some sites previously identified by initial investigations conducted by the Army, as described in the preceding text. Portions of the Archive Search Report required further elaboration, clarification, or supportive documentation. The Army BRAC office conducted additional archives research and the results are presented in a Memorandum of Record dated February 2003 (USACE, 2003). For reference, the following descriptions correlate to the numbers delegated to them in the Archive Search Report, Plate 3 and both documents will be referenced jointly as USACE, 2001 and USACE, 2003.

Four Archive Search Report sites are evaluated in this ROD/RAP. Background information for each of these sites is provided below. The Army is in the process of evaluating and investigating these sites. Limited analytical data are currently available for the Alleged HTRW Disposal site (ASR Site #8). The Archive Search Report sites described below will follow a process of site investigation, then site contamination levels will be compared to action goals presented in Table 1-2, and if, based on this comparison, remediation is warranted, then the RWQCB SCRs will identify the procedure for completion.

Testing Range (ASR Site #4)

The Archive Search Report identified an area labeled as the "Testing Area" based on an aerial photograph dated August 1946. The area is described as a "rectangle approximately 1,000 feet by 100 feet between the sewage treatment plant and the black powder magazine." The Archive Search Report did not explain the basis for labeling the area as a "testing area;" however, the Army BRAC office has historical maps dated 16 May 1945 and 4 December 1952 that outline an area approximately 940 feet by 100 feet labeled "testing range." Neither the BRAC office nor the Archive Search Report team was able to locate accounts on how the site was used. Because Hamilton was not a research and development base, it is not likely that testing of weapons occurred here. Based on the survey of additional maps dated 25 February 1959, 15 December 1963, and 22 November 1963 that depict a portion of the testing range called a "firing range," the Army BRAC office concludes that the "testing range" may have been a small arms target practice area.

Alleged Hazardous, Toxic, and Radiological Waste Disposal Site (ASR Site #8)

In December of 2000, a local resident and former military facility inspector stated that during a routine inspection of Hamilton, in the mid-1980s, he was told various chemicals were improperly disposed of in an area near the north end of the runway (the alleged HTRW Disposal site). Previous sampling in the area included the collection and analysis of three samples within the area in question. Additionally, one boring conducted by URS Group for USACE San Francisco District in 2001-2002 was located within the boundaries of the alleged disposal area. No contamination or debris was reported from this work. The Army will conduct sampling in the area, and a Sampling and Analysis Plan is currently in review. For the purposes of future investigations, this area is being referred to as the Northwest Alleged Disposal Area.

Skeet Range (ASR Site #18)

A skeet range was identified in the Archive Search Report as ASR Site #18. The range was situated inboard, at the corner where South Boundary Road meets East Boundary Road and west of what is now the south runway extension. It is visible on aerial photography dating up to 26 April 1943, but is not observable in photographs beginning in 1946. COCs at a skeet range are lead and other metals from shot and PAHs associated with clay targets.

Firing-In-Butt (ASR Site #19)

A firing-in-butt was identified in the Archive Search Report as ASR Site #19. The Archive Search Report accurately located the historic Firing-In-Butt in the vicinity of the runway and Revetment 25. However, the Archive Search Report incorrectly shows the Butt as being closer to the firing line than photos indicate and incorrectly states the date of its removal. There were three hardstands and a "butt," which is a target surrounded by barricade material. Aircraft machine guns, on both sides of the aircraft, were fired into the earthen mound called a "butt" to check firing alignment. The hardstands with connecting road still exist and are visible in 1960s aerial imagery. The Butt was removed in its entirety in 1947, the disposition of the soil not known.

According to the *Closed, Transferring, and Transferred Range and Site Inventory Report, Hamilton Army Airfield* (URS, 2002), the site is considered to be a negligible explosives safety risk and no explosive-related action is necessary. The report goes on to say that because the aircraft were firmly fixed, there is low probability that rounds strayed from the intended target.

2.1.4.2 General Services Administration and BRAC Soil Stockpiles

Approximately 97 soil stockpiles are currently staged in rows on the runway. In 1995 and 1996, the soil was generated by the environmental remediation of GSA and BRAC properties adjacent to the Main Airfield Parcel. Minor amounts of additional soil were generated in 1997 and 1998. The soil was stockpiled on the runway located on the Main Airfield Parcel. Soil with concentrations above hazardous waste thresholds (lead, PCB, VOCs, pesticides or herbicides) were not stockpiled on the runway and were shipped offsite for disposal. TPH- and PAH-contaminated soils from petroleum sites are not regulated by CERCLA.

The stockpiles on the runway were evaluated for reuse in levees, as excavation backfill, or as capping soil. A plan of randomly generated sampling locations and a statistical approach to the evaluation of the sample results was employed to characterize the stockpiles and determine which stockpiles were ready for reuse and which had unacceptable levels of TPH or PAHs, so were not ready for immediate reuse. Based on the analysis of the sample results, some stockpiles were used in the NHP Levee, and other stockpiles were consolidated into piles of like chemical concentrations. Other piles were left in their original configuration. Additional samples were collected from a number of the consolidated stockpiles to characterize them after consolidation.

The stockpiles have been managed to prevent erosion and sediment transport by rainwater runoff. Each pile has been coated with a soil cement mixture to prevent erosion. Soil and rock berms and straw bales were placed around the stockpiles or at the perimeter of the airfield, taxiways, and former aircraft parking areas to manage and mitigate sediment in runoff from the airfield to the lower-lying grassland areas at the runway edges. The stockpiles were left in an "as-is" condition. The stormwater erosion berms have been maintained and stormwater sampling has been conducted since 1996.

The RWQCB will determine what additional actions (if any) may be required with respect to the management and reuse of the stockpiled soil. The Army will be responsible for conducting any additional actions required by the RWQCB.

2.1.4.3 Radiological Waste Disposal Cylinders

According to the *Base Realignment and Closure (BRAC) Historical Record Search to Identify any Residual Radioactive Material at Hamilton Army Airfield* by the Medical Physics Center 1994, two concrete-capped galvanized cylinders were buried, in accordance with Atomic Energy Commission policy, at Hamilton near an earthen levee in 1963. With the assistance of the U.S. Air Force, the cylinders, confirmed to contain electron tubes and wave-guides, were located northeast of the runway overrun levee. The cylinders were taken offsite on 14 September 1988 and disposed of at a low-level radiological disposal facility in Barnwell, South Carolina. Soil and water samples were taken internally, externally, and adjacent to each culvert, and were tested for radioactivity. All soil samples confirmed no migration of radioactivity to the nearby environment. After excavation of the cylinders, soil samples were collected from the former disposal site and analyzed for gamma spectrometry and tritium. No contamination was detected. After backfilling the excavation to grade, Geiger measurements showed no activity (Weston, 1990).

The California Department of Health Services (DHS) reviewed documentation of the radiological history of HAAF. DHS concluded that the cylinders had been removed from the base and that no contamination had occurred. The DHS findings were documented in a memorandum to the Army dated March 17, 2003 (DHS, 2003).

2.1.5 Background and Nature of Contamination—Environmental Issues Hamilton Wetland Restoration Program

Several issues related to residual contamination have been identified within the Inboard Area. These issues include residual Inboard Area-Wide DDTs, and PAHs in soil near the

runway, and lead-based paint. These issues will be addressed as part of the HWRP. Background information on these issues is provided in the sections below.

2.1.5.1 Residual Inboard Area-Wide DDTs and Polynuclear Aromatic Hydrocarbons Near the Runway

In 1999, the Army conducted a study to evaluate the potential for the presence of pesticides throughout the unpaved areas of the Main Airfield Parcel and the potential for PAHs to be located adjacent to the runway. This study and the results of the study are documented in the Remedial Design Investigation Final Data Report (FW, 2000). During the study, the Army collected 23 samples throughout the Main Airfield Parcel and near the runway to evaluate the presence or absence of pesticides and DDTs.

The study showed that approximately 270 acres of grassland have residual concentrations of DDTs. The concentrations of total DDTs detected ranged from 0.0181 to 0.935 ppm. The study also showed soil along the margins (within 50 feet) of the southern end of the runway contain residual PAHs. The PAH detections are greater along the southern end of the runway, which was the normal landing area. The concentrations of PAHS detected ranged from 0.036 to 54.9 ppm. The residual DDTs and PAHs may pose a potential risk to future wetland receptors if the receptors, or their prey items, are exposed to existing site soil during the development and maturation of the wetland.

The State and Army acknowledge that they have different views regarding the scope of the Army's legal responsibility for the residual concentrations of Inboard Area-Wide DDTs and PAHs in soil adjacent to the runway. Nevertheless, both parties are in full agreement as to the measures necessary to address the remaining contamination, including these residuals, on the HAAF site. Two Alternatives (Alternative 1 and Alternative 4) are developed and evaluated in this ROD/RAP for these issues.

2.1.5.2 Lead-Based Paint

Given the age of existing and previously demolished buildings in the Inboard Area, lead-based paint may have been used on the buildings. The age of historical and existing buildings is described in the EBS (CH2M HILL, 2003). Multiple alternatives are not evaluated in the ROD/RAP for lead-based paint issues. Instead, the ROD/RAP presents the following selected alternative.

To address possible lead contamination from paint used on the buildings, the HWRP will provide 3 feet of stable cover over the footprint of the building and to a distance of 6 feet beyond the building footprint. If 3 feet of cover cannot be achieved, the soil area at the current and previously demolished building locations plus 6 feet beyond the building perimeter will be scraped to a depth of 6 inches and managed elsewhere onsite beneath 3 feet of stable cover. The building foundation and any concrete/asphalt/hard foundation surface adjacent to the building may remain.

TABLE 2.1-1

Inboard Area Site-Specific COCs

Contaminants	Action Goals (ppm)	Former Sewage Treament Plant	Building 26	Building 35/39 Area	Building 41 Area	Building 82/87/92/94 Area	Building 86	PDD Unlined	PDD Lined (In proposed channel)	PDD Lined (Outside proposed channel)	PDD Spoils Pile A	PDD Spoils Pile B	PDD Spoils Pile C	PDD Spoils Pile D	PDD Spoils Pile F	PDD Spoils Pile G	PDD Spoils Pile I
Metals																	
Arsenic	16.7														X		
Barium	190					X											
Beryllium	1.03					X	X	X	X	X	X				X		X
Boron	36.9																
Cadmium	1.2						X					X					
Chromium	112						X										
Cobalt	27.6														X		
Copper	68.1											X					
Lead	46.7														X		
Manganese	943														X		
Mercury	0.43											X					
Nickel	114														X		
Silver	1											X					
Vanadium	118																
Zinc	158										X	X			X		
Semivolatile Organic Compounds (including PAHs)																	
PAHs, total	4.022				X		X								X		
Petroleum Hydrocarbons																	
TPH-diesel	144		X		X												
TPH-motor Oil	144																
TPH-gasoline	12																
TPH-JP-4	12																
Pesticides/PCBs/Dioxins																	
DDTs, total (onsite disposal)	0.03	X[a]		X				X	X	X	X		X	X	X	X	X
DDTs, total (offsite disposal)	1			X				X									

TABLE 2.1-1
Inboard Area Site-Specific COCs

Contaminants	Action Goals (ppm)	PDD Spoils Pile J	PDD Spoils Pile K	PDD Spoils Pile L	PDD Spoils Pile M	PDD Spoils Pile N	ONSFL-54-Inch Line	ONSFL-Hanger Segment	ONSFL-Northern Segment	Revetment 1	Revetment 2	Revetment 3	Revetment 4	Revetment 6	Revetment 7	Revetment 11	Revetment 12	Revetment 13
Metals																		
Arsenic	16.7																	
Barium	190			X						X		X						
Beryllium	1.03																	
Boron	36.9																	
Cadmium	1.2									X	X		X					X
Chromium	112																	
Cobalt	27.6			X														
Copper	68.1											X				X	X	
Lead	46.7			X		X				X	X		X		X			X
Manganese	943											X						
Mercury	0.43																	
Nickel	114																	
Silver	1																	
Vanadium	118																	
Zinc	158			X														
Semivolatile Organic Compounds (including PAHs)																		
PAHs, total	4.022							X		X					X			X
Petroleum Hydrocarbons																		
TPH-diesel	144																	
TPH-motor Oil	144								X									
TPH-gasoline	12						X	X	X					X				
TPH-JP-4	12							X	X									
Pesticides/PCBs/Dioxins																		
DDTs, total (onsite disposal)	0.03	X	X		X	X												
DDTs, total (offsite disposal)	1																	

TABLE 2.1-1

Inboard Area Site-Specific COCs

Contaminants	Action Goals (ppm)	Revetment 14	Revetment 16	Revetment 19	Revetment 21	Revetment 22	Revetment 23	Revetment 25	Revetment 26
Metals									
Arsenic	16.7								
Barium	190		X	X				X	X
Beryllium	1.03								
Boron	36.9								X
Cadmium	1.2			X					
Chromium	112								
Cobalt	27.6								
Copper	68.1			X	X		X		
Lead	46.7			X					
Manganese	943								X
Mercury	0.43								
Nickel	114								
Silver	1								
Vanadium	118				X				
Zinc	158								
Semivolatile Organic Compounds (Including PAHs)									
PAHs, total	4.022			X					
Petroleum Hydrocarbons									
TPH-diesel	144	X		X	X	X		X	X
TPH-motor Oil	144								
TPH-gasoline	12			X	X	X			X
TPH-JP-4	12								
Pesticides/PCBs/Dioxins									
DDTs, total (onsite disposal)	0.03								
DDTs, total (offsite disposal)	1								

x = Contaminant identified as a COC at site.

[a] Not a COC but risk management evaluation determined that remedial action is required for individual detection of DDT.

There are no COCs at the following sites:
Revetment 18/Building 15, Building 20, Building 84/90 Area, Tarmac East of Outparcel A-5, PDD Spoils Pile E, PDD Spoils Pile H, East Levee Generator Pad, Northwest Runway Area, and Revetments 5, 8, 9, 10, 15, 17, 20, 24, 27, and 28.

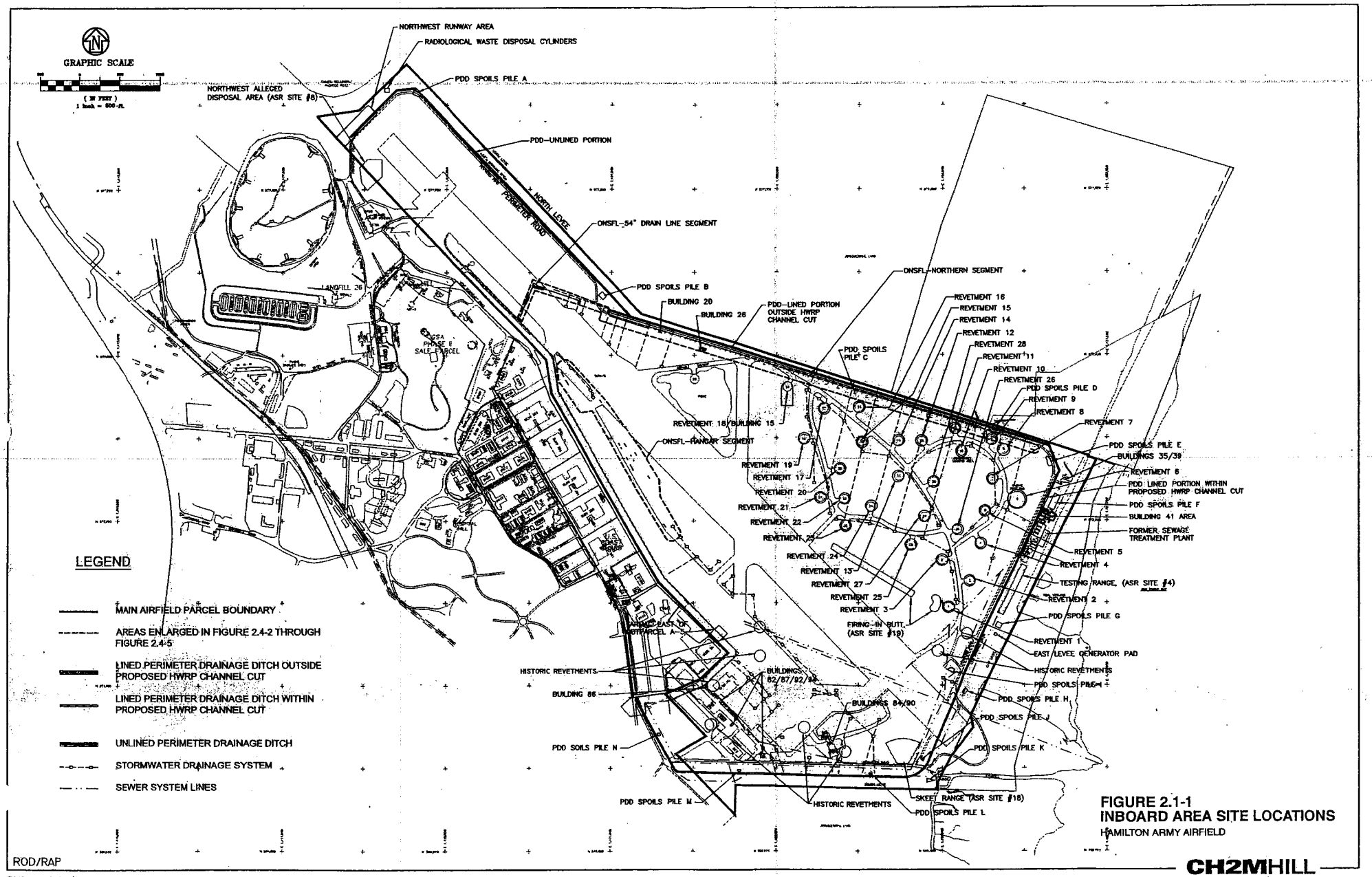

FIGURE 2.1-1
INBOARD AREA SITE LOCATIONS
HAMILTON ARMY AIRFIELD

CH2MHILL

E04200300SSAC_HAAF Fig2.1-1.ai 8/7/03 asm

SECTION 2.2

Overview of Risk Assessment and Action Goals

This section provides an overview of the risk assessment and the process used to establish action goals for Inboard Area sites. Contamination at most of the sites was first evaluated in the risk assessment to make an initial determination of the contaminants of potential concern (COPCs), and the levels that pose a risk. The sites were further evaluated in the FFS based on preliminary action goals, and it was determined that 18 sites did not require further action. Further analysis of the data occurred during preparation of this ROD/RAP, resulting in changes to the action goals and further evaluation of the data. Through that process, two sites that had been identified in the FFS as not requiring further action were determined to require further action. Furthermore, several sites that had not been evaluated in the risk assessment or FFS were determined to require action based on the analytical data collected for those areas and the action goals in this ROD/RAP. The following subsections describe the process used to arrive at these decisions.

2.2.1 Risk Assessment Overview

The baseline risk assessment for HAAF was prepared by the Army for 63 BRAC property sites. The sites were divided into five coastal salt marsh sites and 58 Inboard Area sites. The risk assessment evaluated the Seasonal Wetland as an Inboard Area site; however, it was determined not to be a part of the HAAF Main Airfield Parcel, and is not addressed in this ROD/RAP. This section summarizes the baseline risk assessment for the 57 remaining Inboard Area sites located within the HAAF Main Airfield Parcel. These sites are listed in Table 1-1.

The baseline risk assessment estimated the potential risk that the residual contamination at sites within the Inboard Area may pose to human health and the environment at present, and during the development, maturation, and life of the wetland. The risk assessment assumed that exposure pathways are complete at all sites. For example, the baseline risk assessment assumed that human and ecological receptors were in direct contact with contaminants at a site even where existing contamination is currently covered or is planned to be covered in the future Wetland Restoration Project. Exposure to human or ecological receptors would not occur in this case, provided the contaminants remained covered. As a result, the baseline risk assessment presents a worst-case estimate of where and when remedial actions would be needed to protect human health and the environment for those Inboard Area sites evaluated. Key baseline risk assessment assumptions are as follows:

- Exposures may occur now and in the future because of the chemicals present in the soil or sediment.
- Human and ecological receptors will be present in the future.
- The receptors were assumed to be directly exposed to existing soil or sediment (i.e., the risk assessment did not consider the fact that some sites are covered with concrete or clean fill, or will be covered in the future with imported cover material).

- For the future redevelopment scenario, existing soils will become sediments that support estuarine and freshwater biota.
- The site will not be used for residential or industrial purposes, so these scenarios were not considered in the Human Health Ecological Risk Assessment (HHERA).

2.2.1.1 Baseline Ecological Risk Assessment

The Inboard Area sites are currently grassland habitats or seasonal wetlands, with the PDD supporting a small freshwater community. Construction of a wetland habitat is proposed for the site. The ecological risk assessment considered both current and future land use scenarios for the 57 sites by evaluating the risks to representative plants and animals under estuarine, freshwater, and grassland habitat scenarios for each site. Exposure pathways associated with direct uptake and ingestion were used to assess the risks to the following current and/or future ecological receptors and their associated habitats at the Inboard Area sites:

- **Estuarine Habitat** – algae, pickleweed, amphipods, bay shrimp, northern anchovies, juvenile salmonids, California clapper rail, California black rail, double-crested cormorant, and salt marsh harvest mouse
- **Freshwater Habitat** – algae, amphipods, mosquitofish, great blue heron, and snipe
- **Grassland Habitat** – terrestrial plants, black-tailed deer, California vole, raccoon, burrowing owl, and northern harrier

These receptors were primarily selected to represent specific trophic levels, but some species were selected to represent a trophic level and are also special-status protected species.

The 95 percent upper confidence limit (95th UCL) of the mean was used for the exposure concentrations in the ecological risk assessment (USACE, 2001). The UCL is the 95th percent upper confidence limit of the arithmetic mean concentration for the contaminant. If the 95th UCL exceeded the maximum detected concentration, the maximum concentration was used for the exposure point concentration. The maximum concentration was also used when the number of samples collected for a site was insufficient to calculate a 95th UCL.

The HHERA identified COCs for each Inboard Area site in Table 1-6 of the FFS (USACE, 2001). These COCs included contaminants related to DoD activities at the site that could adversely impact human health or the environment at present, or during the development, maturation, and life of the wetland.

2.2.1.2 Baseline Human Health Ecological Risk Assessment

Current and future land use scenarios were assessed during the HHERA for the Inboard Area sites. Recreational uses of the grassland and freshwater marsh environments were considered potentially complete exposure pathways under current land use conditions. Future land use conditions considered recreational uses of the grassland, freshwater marsh, and future estuarine environments as potentially complete exposure pathways. Based on the proposed land use, current and future land use exposure scenarios for humans were expected to be similar for terrestrial grassland and freshwater marsh environments; the Inboard Area sites are currently undeveloped. Residential and industrial scenarios were not

considered. Deed restrictions will specify that the property shall not be used for residences, schools, daycare facilities, hospitals, hospices, or other similar sensitive uses.

The following receptors and exposure pathways were considered for the Inboard Area sites for the HHERA (USACE, 2001):

- **Marsh Recreational User** – the exposure pathways considered for this receptor included incidental ingestion of affected soil, direct skin contact with contaminated soil, skin contact with surface water, and incidental ingestion of surface water.
- **Recreational Angler** – the exposure pathways considered for this receptor included ingestion of fish living in surface water, and ingestion of shellfish living in the water at the sediment/surface-water interface.
- **Grassland Recreational User** – the exposure pathways considered for this receptor included incidental ingestion of affected soil, direct skin contact with affected soil, and inhalation of windborne soil.

Groundwater and secondary pathways were not considered complete pathways.

The HHERA identified human health COCs for each Inboard Area site. Section 3 and Tables 3-6 through 3-24 of the HHERA identify and discuss the COCs. These COCs included contaminants that were related to DoD activities at the site that were judged to have the potential to adversely impact human health during the development and maturation of the wetland.

2.2.2 Action Goals

The objective of this ROD/RAP is to remove and/or cover contamination at the Inboard Area, rendering it suitable for open-space wetland restoration. To achieve these objectives, this document establishes action goals protective of wetland receptors (including sensitive species). The action goals for the Inboard Area sites are provided in Table 2.2-1. Numerical values for each action goal are set for the various contaminants found at the Inboard Area sites. However, action goals apply only to specific contaminants at each site, because the COCs differ at each site. Table 2.1-1 shows the specific contaminants of concern at each site and the corresponding action goal. The following paragraphs describe the process for selecting specific COCs at the Inboard Area sites and the sources for the action goals.

COCs for the Inboard Area sites were established by evaluating the results of the risk assessment during the FFS process and were further evaluated during the ROD/RAP. Two sites, Spoils Pile C and Spoils Pile L, screened out in the FFS were included for further action in the ROD/RAP. One site, the Northwest Runway Area, was included in the FFS for further evaluation, but was screened out during the ROD/RAP re-evaluation.

The results of the baseline risk assessment were further evaluated in the FFS to determine how the potential risk should be addressed by proposed remedial actions. The FFS refined the conceptual model used in the baseline risk assessment. Similar to the baseline risk assessment, the FFS conceptual model was based on potential exposure pathways and human and ecological receptors for a wetland end-use. However, the baseline risk assessment evaluated every receptor at each site, while the FFS conceptual model identified

and evaluated receptors based on the general habitat types (upland, estuarine, freshwater, or recreational) that are expected to be developed at each site. These general habitat types were established by the preferred wetland configuration (Jones & Stokes, 1998).

Although the wetland design has not been finalized, the general habitat types and receptors at a specific location are not expected to change significantly because of the physical constraints of the site. For example, a planned upland area is not likely to become a subtidal channel, and vice versa. The FFS conceptual model assumed estuarine and human recreational receptors at each Inboard Area site and additional freshwater receptors at the Building 82/87/92/94 Area; PDD Spoils Piles A, B and N; and the PDD Unlined Portion.

The FFS used hazard indices (HIs) developed in the baseline risk assessment to determine whether a site required remedial action. To require remedial action and evaluation in the FFS, a site had to have at least one receptor with an HI greater than 1. The receptors evaluated included those identified in the FFS conceptual model (as described above).

For each remaining site that required further evaluation, the FFS established site-specific FFS COPCs based on the receptors that were expected to be present during the development, maturation, and life of the wetland and the potential risk posed by residual contaminants. The site-specific FFS COPCs were determined as follows: the FFS reviewed the risk assessment COPCs at each site for the receptors identified by the FFS conceptual model. If the ecological hazard quotient (HQ) was greater than 1.0, or the human health HQ was greater than 1.0, or the incremental lifetime cancer risk (ILCR) was greater than $1x10^{-6}$, then the contaminant was considered a site-specific FFS COPC. The FFS COPCs determined in the FFS on a site-specific basis are listed in Table 1-2 of the FFS (USACE, 2001). The FFS then determined COCs by comparing FFS COPC concentrations to preliminary action goals (called comparator values in the FFS). The COCs determined in the FFS on a site-specific basis are listed in Table 1-5 of the FFS (USACE, 2001).

The process for determining the action goals and how those action goals would be compared to the sites was refined during development of the ROD/RAP. For each site, the ROD/RAP re-evaluated the COCs presented in the FFS by comparing each site-specific FFS COPC to the action goals established for the ROD/RAP (see below). The ROD/RAP compared the 95th UCL (or maximum if fewer than 5 samples were collected) concentrations for each FFS COPC to the action goals. If the 95th UCL (or maximum, if fewer than 5 samples were collected) concentration for a COPC was greater than the action goal, the contaminant was considered a COC. A site had to have at least one COC to be evaluated in the ROD/RAP.

For each site, the ROD/RAP identifies COCs as the contaminants that should be compared to the action goals. Detections of these COCs above the action goals are evaluated for remedial actions in this ROD/RAP. The action goals selected in this ROD/RAP for the Inboard Area are based on a number of sources (see Table 2.2-1). For metals, the primary sources are Inboard Area ambient concentrations or San Francisco Bay ambient concentrations, whichever is higher. For total PAHs, the reference is the ER-L. Petroleum hydrocarbon action goals are based on the Presidio of San Francisco Saltwater Ecological Protective Zone. DDT action goals are derived from RWQCB calculations. The DDT values were developed in the Coastal Salt Marsh Focused Feasibility Study (CH2M HILL, 2003).

TABLE 2.2-1
Action Goals—Inboard Area
Hamilton Main Airfield Parcel ROD/RAP

Contaminant	Action Goals (ppm)	Source[a]
Metals		
Arsenic	16.7	BRAC Soils Ambient
Barium	190	BRAC Soils Ambient
Beryllium	1.03	BRAC Soils Ambient
Boron	36.9	BRAC Soils Ambient
Cadmium	1.2	ER-L
Chromium	112	SF Bay Ambient
Cobalt	27.6	BRAC Soils Ambient
Copper	68.1	SF Bay Ambient
Lead	46.7	ER-L
Manganese	943	BRAC Soils Ambient
Mercury	0.43	SF Bay Ambient
Nickel	114	BRAC Soils Ambient
Silver	1	ER-L
Vanadium	118	BRAC Soils Ambient
Zinc	158	SF Bay Ambient
Semivolatile Organic Compounds (including PAHs)		
PAHs, total	4.022	ER-L
Petroleum Hydrocarbons		
TPH-dl/TPH-motor oil[b]	144	Presidio—Saltwater Ecological Protective Zone
TPH-g/JP-4	12	Presidio—Saltwater Ecological Protective Zone
Pesticides		
DDTs, total[c]	0.03	RART—California clapper rail

NOTE: This is a comprehensive list of action goals. All action goals do not apply at each site.

[a] The sources of the action goals are:

- **Metals:** Background concentrations for metals were primarily used as action goals unless the background concentrations were less than available risk-based numbers. Site-specific ambient levels from Appendix A - U.S. Army, 2001, *Final Human Health and Ecological Risk Assessment*; Effects Range-Lows (ER-Ls) from Long, E.R, D.D. MacDonald, S.L. Smith, and F.D. Calder, 1995, "Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments," *Environmental Management*, 19:81-97; *San Francisco Bay RWQCB Staff Report: Ambient Concentrations of Toxic Chemicals in San Francisco Bay Sediments*, May 1998.
- **Petroleum hydrocarbons:** *Report of Petroleum Hydrocarbon Bioassay and Point-of-Compliance Concentration Determinations; Saltwater Ecological Protection Zone; Presidio of San Francisco, California,* Dated December 1997. The numbers in this report were developed for a similar site with similar ecological receptors.
- **PAHs:** ER-Ls from Long, E.R, D.D. MacDonald, S.L. Smith, and F.D. Calder, 1995, "Incidence of Adverse Biological Effects within Ranges of Chemical Concentrations in Marine and Estuarine Sediments," Environmental Management, 19:81-97. The ER-Ls were used as action goals because the ER-Ls are accepted as being protective of ecological receptors.
- **Pesticides:** The DDT values were developed in the Coastal Salt Marsh Focused Feasibility Study (CH2M HILL, 2003).

[b] The action goal for TPH diesel/TPH motor oil is also used as the action goal for UHE (unknown hydrocarbons extractable).

[c] The total DDT concentration in the Inboard Area shall not exceed 1.0 ppm. Areas with total DDT concentrations greater than 1.0 ppm shall be excavated and disposed of offsite.